

REMARKS

In the Office Action dated February 21, 2006, claims 1-18 are pending, claims 16-18 are withdrawn from consideration and claims 1-15 are rejected. The rejection is made final. Reconsideration is requested for at least the reasons discussed hereinbelow.

The above amendments to the claims are made to more particularly point out and distinctly claim the subject matter regarded as invention. Support for the amendments can be at least in figure 2. See, also, the disclosure at page 37, lines 20-23 that the cross-section of the light shielding layer is asymmetrical (a clear description is given that portions 19c of said layer are longer than portions 19b). Also, claim 10 has been amended to recite "a first insulating film" and "a second insulating film" in order to address the fact that this claim currently recites "an insulating film" twice as two separate elements, and claim 11 has been amended to correct the fact that "the central axis" lacks antecedent basis.

Claims 1-6 and 8-15 are rejected under 35 U.S.C. §102(b) over JP 2000-164837 ("JP'837"). JP'837 Figure 6 illustrates a semiconductor structure that is substantially different from that described in present application Figure 2. JP'837 Figure 6 shows a light shield layer that is symmetrical about a center axis; it has horizontal portions in the same plane as the transfer electrode which portions are of equal length. To the contrary, in the present invention, the horizontal portions of the light shield layer 19 are not equal (i.e., not symmetrical around a center axis).

Thus the present invention, as set forth in claim 1, provides a semiconductor apparatus having at least the following features:

Feature A: "the interlayer lens positioned such that an optical axis of the interlayer lens is parallel to the central axis of the opening region".

Feature B: "the opening region having a central axis and being bounded by a light shielding layer wherein a cross-section is asymmetric to the central axis".

As discussed previously, Feature A provides the advantage that the light is efficiently received by the light receiving layers (as described on page 34, lines 1-8 of the original specification). An

advantage which can be achieved by Feature B is discussed on page 37, lines 20-24, i.e., the light shielding film securely blocks the channel stopper portions from the light.

JP'837 fails to teach or suggest a light shielding layer wherein a cross-section is asymmetric to the central axis of the opening region. JP'837 discloses the use of a light shielding layer 5, portions of which are provided on layer 2. As recognized by the Examiner in the office action, however, portions of light shielding layer 5 that are provided on layer 2, as illustrated in the drawings, have the same length on either side of the opening. Thus, JP'837 discloses the use of a symmetrical cross-section for the light shielding film, and not the asymmetrical structure as set forth in the present application.

As described in the "Background Art" section of the present specification, conventional devices, which were structured as shown in figure 4, have had the problem of reduced light efficiency, due to the fact that an optical axis of an interlayer lens, was not provided parallel to a central axis of the interlayer lens (line C-C'). As a consequence of this structure, less light could reach the receiving portions 102.

Applicants further assert that one skilled in the art would not have combined the disclosure of JP'837 with the conventional devices, as were discussed in the "Background" Section, in order to arrive at the presently claimed invention, which comprises Features A and B.

As recognized by the Examiner, misalignment of the lens in JP'837 is prevented by ensuring that the portions of layer 5 that are formed directly on layer 2 are formed such that they have the same length on either side of the opening. Therefore modification of the structure of JP'837 to use an asymmetrical cross-section of the light shielding layer, as presently claimed, would have implied to one of ordinary skill in the art that the prevention of misalignment could no longer be achieved.

It is respectfully submitted that such modification would not have been obvious to one of ordinary skill in the art. It also is submitted that that presently claimed invention is not

anticipated by JP'837.

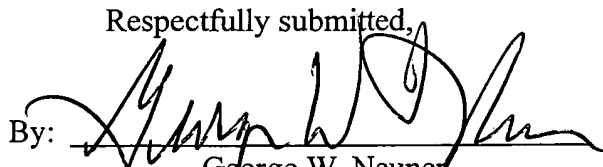
Claim 7 is rejected under 35 U.S.C. §102(b) over JP'837 in view of JP 4-111354 ("JP'354"). JP'837 is discussed in detail above. JP'354 *fails* to make up for the deficiencies in JP'837. JP'354 also fails to teach or suggest providing an optical axis of an interlayer lens parallel to a central axis of the interlayer lens in combination with a light shielding layer wherein a cross-section is asymmetric to the central axis of the opening region.

Thus, it is not seen how the presently claimed invention would have been obvious to one of ordinary skill in the art in view of any combination of JP'837 and JP'354.

In view of the amendments and discussion above, it is respectfully submitted that the present application is in condition for allowance. An early reconsideration and notice of allowance are earnestly solicited.

If for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105**.

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Respectfully submitted,

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